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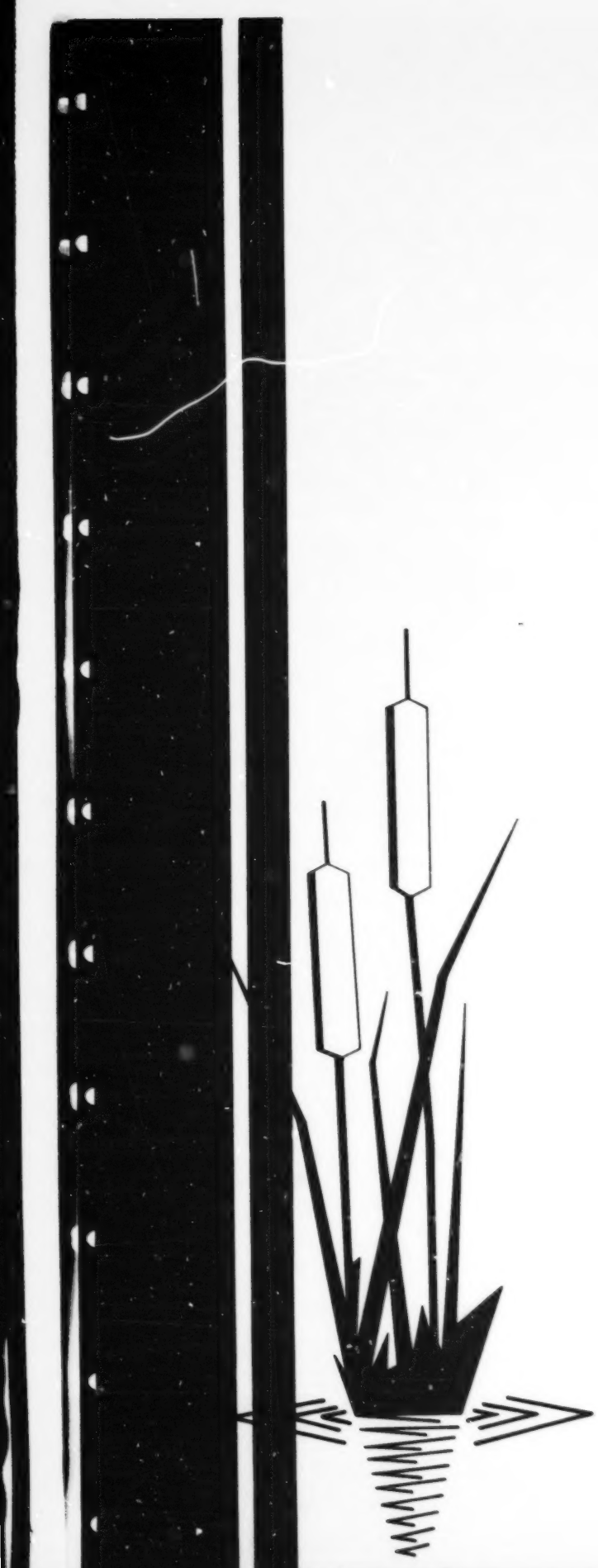

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ABSTRACT

The Beverly herd of barren-ground caribou (Rangifer tarandus groenlandicus) was sampled in March 1984 primarily to assess physical condition and changes in condition since early December. A sample of 115 caribou obtained from a segment that spent most of the winter in the forest southeast of Porter Lake revealed high condition indices (weight and fat stores) and high pregnancy rates (33% in yearlings and 97% in older females). Thirty-five caribou examined from another concentration of caribou located on the tundra in the Sifton Lake region were lighter, had lower fat indices and lower pregnancy rates. Caribou in this northern segment, which spent about 70% of the period October to March on the tundra, were in about the same physical condition as in early December. As in 1982-83, the caribou were able to maintain about the same level of condition from November-December to late March. The close relationship between condition indices and fat reserves suggests that the segment that wintered in the forest southeast of Porter Lake was in better condition in October 1983 than the northern segment. There is no evidence to date that the winter range is limiting the present population.

INTRODUCTION

A 5-year study of the effects of forest fires on the Beverly Herd of barren-ground caribou (Rangifer tarandus groenlandicus) began in 1982-83. One component of the study involving four field seasons, is an assessment of the adequacy of the present winter range to support the present population of caribou. The assessment is based on the performance of caribou over the winter period in relation to the performance of caribou in herds occupying ranges where the burn rates were much lower. Performance is gauged largely from measures of body weight and fat reserves. Caribou in the Beverly herd maintained about the same level of condition from November 1982 (Thomas et al. 1983) to March 1983 (Thomas 1983).

In December 1983, a sample of 75 caribou was obtained from the Beverly herd (Thomas and Kiliaan 1984). This report contains the results from the March 1984 sample and compares them with data from that and earlier collections.

METHODS

Surveys on March 15 and 16, 1984, identified two main segments of the Beverly herd, plus a small group south of Great Slave Lake that split off the main herd in December (Fig. 1). The largest group was on the tundra north and east of Artillery Lake, with the largest concentration in the Douglas Lake region. A second group extended from the north end of Porter Lake to about 100 km to the southeast. Logistical and financial constraints dictated that the larger sample must come from the segment in the forest. Consequently, a crew was

moved into the Porter Lake camp on March 17. In the following five days, 33, 35, 39, 6 and 2 (total 115) caribou were obtained near the camp by use of snowmobiles. The camp was vacated on March 23 and 24.

Plans to sample caribou from the northern segment by Single Otter aircraft and return them to Porter Lake were abandoned because of sporadic availability of suitable aircraft and poor weather on the tundra. The collection of caribou was delayed by bad weather until March 29 when a Twin Otter flew a crew to a camp on Sifton Lake, established on March 25 by the NWT Wildlife Service. The aircraft was used to transport a hunter and snowmobile about 8 km south of the Sifton Lake camp. Lots of 20 and 15 caribou were shuttled intact to the camp for weighing and necropsy.

Procedures used to sample the caribou were explained in earlier reports (see Literature Cited). Blood was obtained from only about half of the caribou at each location because of a snowmobile breakdown at Porter Lake and logistical constraints at Sifton Lake. Counts of warble bots were not obtained for these because of insufficient time.

There are few statistical comparisons in this report because it would be premature to do them until final ages are assigned to the caribou after examination of rest lines in their teeth.

RESULTS

1. Location of caribou herd segments

Survey flights in mid March revealed major concentrations of caribou north and east of Artillery Lake and southeast of Porter Lake.

There were also smaller numbers south of the East Arm of Great Slave Lake and in the Selwyn and Kasba lakes region (Fig. 1).

2. Age Structure of the Samples

The sample of 115 caribou taken at Porter Lake contained only eight calves, as they were selected against. There was some selection for large bulls. Otherwise, the sample should be representative of caribou in the region. The structure (Table 1) reflects a low proportion of bulls over 4 years old and an over-representation of females 4 years old. However, some of those females may be 5 years old and revised totals will be reported after ages are better estimated from rest lines in teeth.

The sample from Sifton Lake was over-represented by caribou 2-5 years old (80%), especially 3-year-old males. Calves and large bulls were selected against because calves were thin and large bulls were difficult to load in the airplane. There was some selection for adult cows. The two groups from which caribou were obained were not representative of caribou in the Sifton Lake area. They happened to be comprised largely of caribou 2-4 years old, typical of groups near the rear of migrations and movements.

The combined samples are undoubtedly over-represented by caribou 3 years old (23%) and 4 years old (25%). However, high proportions in those age-classes also reflect high survival of calves born in 1980 and 1981. Recruitment values obtained in 1981 and 1982 for those cohorts were 11 and 25% (Draft Caribou Management Plan, 1984). There is a distinct possibility that only one of two or three wintering segments was sampled in those years because there were insufficient

funds for range-wide (including tundra) surveys to detect all wintering groups. The recruitment value for 1981, representing survival of calves produced in 1980 (the 1980 cohort), was probably low. The 1980 cohort is represented by a relatively large number of caribou in collections since 1982.

3. Condition Indices

Indices of physical condition of caribou sampled at Porter Lake (Table 2) revealed that fat indices in females increased through the first three age-classes and then stabilized. In males, there was generally an increase in fat indices with age. Fat indices in female calves were about the same as in male calves. Fat reserves were much higher in females than in males in the 2 year and 3 year age-classes. The kidney fat index was higher in females than in males, except in calves. However, the weight of fat around the kidneys differed little between the sexes in age-classes 4 years and older.

Caribou obtained at Sifton Lake were lighter in all nine sex- and age-classes for which there were data. For example, 3-year-old males were 10 kg heavier at Porter Lake than at Sifton Lake ($P < 0.01$) and females 4 years old were 9 kg heavier ($P < 0.01$). Those age and sex classes contained sufficient numbers for statistical comparisons.

Fat indices were generally higher in caribou from Porter Lake than those from Sifton Lake. An exception was similar indices in males 2 years old. The greatest differences were in depths of back fat in females. Some examples were 8 mm vs 2 mm, 20 mm vs 12 mm. and 22 mm vs 10 mm in age-classes 2, 3 and 4 years, respectively.

Many of the differences in back fat depths and kidney fat indices were significant ($P < 0.05$) even with the small sample sizes obtained at Sifton Lake.

4. Pregnancy Rates

Three of nine yearlings obtained at Porter Lake were pregnant, as were 73 of 75 older females. One female, estimated to be 7 years old, was not pregnant and it never had been. Its ovaries were undeveloped and the uterus was similar to that in a nonpregnant yearling. If it is excluded as a rare event in the population, the pregnancy rate was 99% in females older than 2 years.

Two of six females over 4 years old were not pregnant in the Sifton Lake sample. The sample was added to the sample obtained in December 1983 from near Tent Lake, NWT, to increase the sample size. The results (columns B plus C in Table 4) indicate a lower pregnancy rate in the northern segment: 0% vs 33% in yearlings; 80% vs 100% in females 2 years old; and 74% vs 97% in females over 4 years old.

5. Relationship Between Physical Condition and Pregnancy Rates

Four indices of physical condition were significantly higher in pregnant yearlings obtained at Porter Lake than in nonpregnant individuals from Porter Lake and Sifton Lake (Table 5). The same relationship existed in females over 4 years old. It was necessary to include caribou from both collection sites in the second case in order to obtain a sufficient sample of nonpregnant individuals.

6. Diseases and Parasites

The highest counts of warble fly bots were in males and generally

the numbers of bots increased with age in that sex (Table 2). In contrast, the counts decreased in females from age-classes 1 year through 4 years.

Nose bots were found in the throat "pouches" of one of seven caribou examined. The bots develop in the pharynx of caribou after the nostril fly (Cephenemyia trompe) injects larvae into the nostrils of caribou in the summer. The incidence of this parasite in the Beverly herd will be examined in future collections.

Test results for brucellosis in the March 1983 sample revealed that 2 of 118 samples were positive and another two were suspect cases. The organism, Brucella suis, differs from the one (B. bovidae) found in bison in Wood Buffalo Park.

Fecal pellets were examined by Dr. Murray Lankester of Lakehead University for the prevalence of first-stage larvae of Elaphostrongylus cervi. The parasite is associated with the central nervous system and thoracic musculature of several species including wild and domestic reindeer in Scandinavia and the Soviet Union, and woodland caribou in Canada. Adult worms about 2-4 cm in length occur in connective tissue under the skin and often produce yellowish discoloration. Severe infections could result in neurologic disease and pneumonia.

Prevalence of larvae in feces from the samples obtained in March and December 1983 were 35% (49/142) and 60% (32/53), respectively. These results suggest there may be seasonal differences in the prevalence of the parasite in caribou and justify further collections.

Hydatid cysts were noted in the lungs of two of the 150 caribou sampled in March 1984. The cysts represent the larval stage of

Echinococcus granulosis, a tapeworm that occurs in wolves, foxes and dogs. The lungs of a female estimated to be 6 years old were full of cysts up to about 5 cm in diameter. The female's weight and back fat depth were below average for that age-class, at 86 kg and 12 mm, respectively. Its kidney fat weight (37 g) and kidney fat index (KFI)(18) were the lowest of 27 females in its age-class taken at Porter Lake. The other infected caribou was a female about 8 years old and its weight, (84 kg), depth of back fat (6 mm), kidney fat (64 g), and KFI (38) were far below average. In fact, its kidney fat and KFI were second lowest (to the one described above) in the 6-11 year age-class. These two cases suggest that the parasite has a debilitating effect on individuals.

7. Sampled Segments and Herds

Monthly reconnaissance flights over the caribou winter ranges provided information on the winter distributions and movement patterns of caribou. However, the surveys did not provide sufficient data to be certain of the exact movement patterns of all herd segments and the interrelationships among them. The segment that wintered southeast of Porter and Manchester lakes from January to April entered the region from the east. They are believed to be the segment encountered by Tim Trottier (pers. comm.) in the Selwyn and Snowbird lakes region in November. By May 4, the segment was migrating to the Beverly herd's calving grounds, with the leaders east of Lookout Point (Thelon River) and the trailers as far south as the lower Clarke River and Beaverhill Lake in the west and Rennie and Sid lakes in the south and east (Fig.

3). Trails between Eyeberry Lake and Grassy Islands on the Thelon River indicated that the migration was joined by caribou from the west. The origin of those caribou was probably the group that wintered south of the East Arm of Great Slave Lake.

A large segment of presumably the Beverly herd travelled in November and December from the Sid Lake-Damant Lake region to north and south of the East Arm of Great Slave Lake (Thomas and Kiliaan 1984). The distribution of that segment in January and early February may have overlapped with that of a segment of the Bathurst herd that was reported to be north of Great Slave Lake in November (D. Heard, pers. comm.). A segment of the large concentration that wintered north of Great Slave Lake travelled to the east in February and leaders reached the Walmsley Lake region by the 24th. In mid-March, they were in the Clinton Colden and Artillery lakes region and as far east as Sifton and Campbell lakes. The distribution extended almost to the Thelon River by the end of March and therefore that segment was considered to be part of the Beverly herd.

In early May, large numbers of caribou were on a front from MacKay Lake in the southwest to the Ellice River at 66° N latitude in the north (Fig. 3). The direction of movements on May 2-4 changed uniformly and gradually from westerly in the MacKay Lake region to northerly in the Ellice River region. That segment, because of its location and direction of movement, must be considered part of the Bathurst herd. Its origins and relationship to the segment of the Beverly herd that migrated in December into the region north of Great Slave Lake will never be known.

The segment sampled at Porter Lake was undoubtedly part of the Beverly herd. It wintered in the north-central portion of the traditional winter range of that herd and it tracked toward the calving grounds of the Beverly herd. The segment sampled at Sifton Lake was also considered to be part of the Beverly herd, but with less certainty, because it was not possible to maintain contact with the group in April. It may have tracked east to join the other component of the Beverly herd in the Clarke River region. It may have travelled northeast to pass between the Thelon and Back rivers. A portion of it may have joined the segment observed in the Beechy Lake and Ellice River region in early May.

DISCUSSION

1. Sample Compositions

Caribou sampled at Sifton Lake were of similar composition to the December 1983 sample obtained east of Tent Lake. The segment that passed through the Tent Lake region in December 1983 spent the last half of December through February to the north and south of the East Arm of Great Slave Lake. The majority were north of the lake and about half of them spent much of their time on the tundra. The northern segment spent about three-quarters of the October-March period on the tundra and about half of the December-March period on it.

2. Physical Characteristics

In assessing changes in conditions from December to March, the Sifton Lake sample must be compared with the Tent Lake sample. Those samples were believed to be from the same wintering segment

of the Beverly herd. The data on body weights (Table 6) suggest a slight decline in condition during the winter. Decreases in weight occurred in five sex-and age-classes and increases in two. Body weights in March 1984 at Sifton Lake were similar to those 1 year earlier but generally they were lower than 2 years earlier.

Depths of back fat in caribou of the northern segment changed little from December 1983 to March 1984 (Table 7). Depths decreased in four sex and age categories and increased in three. The largest decline in back fat was in females 3½-4 years old: from 19 mm to 9.5 mm.

Back fat depths suggested that the condition of the caribou obtained at Sifton Lake was in general slightly better than a year earlier, but poorer than 2 years earlier.

The average weights of fat around the kidneys generally were greater in the samples from Sifton Lake than they were 4 months earlier (Table 8). Fat depths were only marginally higher in the Sifton Lake sample than in a sample from east of Tent Lake a year earlier. They were about the same as in a sample taken at Halliday Lake in March 1982.

Kidney fat indices (Table 9) suggest that internal fat reserves were slightly higher in the two oldest age-classes of females taken at Sifton Lake than they were in December. The indices were generally higher than they were a year earlier but down marginally from the March 1982 sample. The indices for caribou over 2 years old taken at Porter Lake were higher than in any of the other samples.

The indicators of physical condition did not change consistently from December 1983 to March 1984. Body weight generally decreased, back fat depths were similar (declines lead increases), and kidney fat increased in females over 5 years old but not in younger caribou of both sexes.

The condition indices indicated that the caribou on the tundra in March 1984 were perhaps in marginally better condition than 1 year earlier. They were not as heavy or as fat as the sample obtained in March 1982.

3. Pregnancy Rates

Reliable estimates of pregnancy rates depend on large sample sizes. The rates for the northern segment were higher than in previous years for the 3-and-4-year age-classes but lower for older females (Table 10). The weighted averages for the four samples (Table 10) obtained in the last 3 years are 9, 80, 81 and 88% for age-classes 2, 3, 4 and >4 years, respectively.

In order to estimate the pregnancy rates for the Beverly herd in 1983-84, it is necessary to estimate the number of adult females in each of the two segments and weight the pregnancy rates (Table 4) accordingly. Assuming that females of breeding age comprised 70% of 30,000 caribou in the segment southeast of Porter Lake (21,000) and that breeding females comprised 50% of 100,000 (50,000) caribou in the other segment, the pregnancy rates of the two segments should be weighted by a ratio of about 1:2.38. If this is done, the pregnancy rates are 9, 86, 98, and 83% for age-classes 2, 3, 4 and >4 years, respectively.

4. Pregnancy Rates in Relation to the Condition of Caribou

The comparisons between pregnant and nonpregnant females in two age-classes (Table 4) indicated that pregnancy rates are related to physical condition. This relationship is further demonstrated by trends since 1980 in pregnancy rates and condition indices of females over 3-years-old (Figure 2). The pregnancy values in 1980 and 1981 are unreliable because of the small sample sizes but there is support for the high value in 1981. The Fort Smith Hunters and Trappers Association examined 40-60 females in March 1981 at Quinn Lake and reported that all were pregnant including yearlings (J. Schaefer, pers. comm.). The results over the 5 years (Table 11, Fig. 2) show that the trends in pregnancy rates roughly paralleled the condition trends.

5. Adequacy of Winter Range

The results obtained over the last 2 years suggest that the Beverly herd was able to maintain its early winter level of condition over the two winter periods. There is no evidence that the combined forested and adjacent tundra winter ranges are limiting present numbers of caribou in the herd. The greater use of tundra ranges in the winter of 1983-84, compared with 1982-83, resulted in no significant changes in condition over the winter period.

The pronounced differences in condition between the northern and southern wintering segments is puzzling and unprecidented. There are two possibilities: (1) The two groups entered the winter in similar condition and the one in the forest gained condition during the winter

because of better nutrition or less expenditure of energy for travelling, obtaining food, and maintaining body heat. (2) The southern segment entered the winter in better condition than the northern segment and maintained it during the winter.

The second alternative is favored because the higher pregnancy rates suggest that the southern group was in better condition than the northern one at the time of the rut in October. Furthermore, foraging conditions in the region occupied by the southern group from January to March was evaluated as quite severe. Snow cover was about average in January and February and deeper than average by late March. There was an 8 cm-thick hard crust of snow just above the vegetation in the region occupied by the southern group, which caused the caribou to dig craters under trees and resort to arboreal (tree) lichens for part of their forage requirements. The data on snow conditions will be included in the next report, which will discuss movements of the herd in the past two winters.

If the second alternative is accepted, the southern group must have experienced better environmental conditions during the summer of 1983 than the northern group. This particular problem cannot be resolved because movements of the segments were not monitored in the summer of 1983. Such monitoring entails aerial surveys about every 2 weeks in July, August and September. Monthly surveys would be adequate if members of each segment were equipped with radio collars.

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Table 1. Age distributions of caribou obtained in March 1984 at Porter and Sifton Lakes, NWT.

Age (yr)[a]	Porter Lake		Sifton Lake		Totals
	Females	Males	Females	Males	
1	4	4	0	0	8
2	9	5	3	4	21
3	11	10	4	9	34
4	25	5	6	2	38
5	9	1	3	0	13
6-11	27	2	3	1	33
>11	3	0	0	0	3
Totals	88	27	19	16	150

[a] To nearest year and based on degree of tooth wear.

Table 2. Statistics (mean ± SE)[a] for the March 1984 sample of caribou obtained at Porter Lake, NWT.

Sex	Age[b]	No.[c]	Weight (kg)	Back fat depth (mm)	Kidney fat		Warble bots
					Weight (g)	Index	
Female	1	4	42 ± 1	1 ± 0	25 ± 4	26 ± 5	114 ± 24
Male	1	4	45 ± 1	2 ± 1	26 ± 6	23 ± 5	128 ± 48
Female	2	9	63 ± 3	8 ± 3	73 ± 12	52 ± 7	101 ± 21
Male	2	5	65 ± 6	1 ± 0	41 ± 5	29 ± 3	199 ± 42
Female	3	11	80 ± 1	20 ± 3	109 ± 10	75 ± 7	70 ± 19
Male	3	10	86 ± 4	2 ± 1	78 ± 6	43 ± 4	153 ± 48
Female	4	25	87 ± 1	22 ± 2	128 ± 8	77 ± 5	38 ± 16
Male	4	5	105 ± 4	12 ± 5	131 ± 19	57 ± 5	200 ± 77
Female	5	9	84 ± 1	21 ± 2	136 ± 11	81 ± 7	19 ± 6
Male	5	1	112	12	131 ±	57	470 ±
Female	6-11	27	88 ± 1	21 ± 2	122 ± 7	71 ± 5	28 ± 6
Male	6-11	2	127 ± 2	24 ± 10	126 ± 13	47 ± 0	406 ± 314
Female	>11	3	91 ± 7	21 ± 3	132 ± 21	68 ± 7	30 ± 18

[a] Mean = average; SE = standard error.

[b] Age in June 1984, based on degree of tooth wear.

[c] No. = sample size.

Table 3. Statistics (mean ± SE) for the march 1984 sample of caribou obtained at Sifton Lake, NWT.

Sex	Age	No.	Weight (kg)	Back fat depth (mm)	Kidney fat	
					Weight (g)	Index
Female	2	3	59 ± 2	2 ± 0	57 ± 18	42 ± 11
Male	2	4	62 ± 2	1 ± 0	41 ± 6	29 ± 5
Female	3	4	75 ± 2	12 ± 2	84 ± 9	53 ± 6
Male	3	9	76 ± 3	1 ± 0	70 ± 4	40 ± 3
Female	4	6	78 ± 1	10 ± 3	113 ± 13	71 ± 8
Male	4	2	89 ± 1	1 ± 0	56 ± 4	22 ± 2
Female	5	3	73 ± 6	2 ± 1	78 ± 23	44 ± 13
Female	6-11	3	83 ± 1	16 ± 7	94 ± 29	51 ± 17
Male	6-11	1	100	0	81	30

Table 4. Age-specific pregnancy rates for caribou collected at Porter and Sifton Lakes in 1984 and Tent Lake in December 1983.

Age (yr)	Porter Lake Mar. 1984 A	Sifton Lake Mar. 1984 B	Tent Lake Dec. 1983 C	1983-84 B+C	1983-84 A+B+C
1	0/4	0/0	0/0	0/0	0/4
2	3/9	0/3	0/7	0/10	3/19
3	11/11	4/4	4/6	8/10	19/21
4	24/25[a]	6/6	6/6	12/12	36/37
>4	38/39	4/6	16/21	20/27	58/66

[a]Exception was an atypical barren female with undeveloped ovaries and a juvenile reproductive tract.

Table 5. Physical condition of pregnant (P) and nonpregnant (NP) females in two age-classes in the March 1984 sample of caribou (sample sizes in parentheses).

Age-Class (yr)	Reproductive status	Sample size	Weight (kg)	Back fat depth (mm)	Kidney fat (g)	Kidney fat index
2	Pregnant[a]	3	73 ± 4	18 ± 4	116 ± 16	77 ± 8
	Nonpregnant[a]	6	59 ± 3	3 ± 2	52 ± 7	40 ± 5
2	Nonpregnant[b]	3	59 ± 2	2 ± 0	57 ± 18	42 ± 11
>4	Pregnant[c]	42	87 ± 1	20 ± 1	126 ± 5	73 ± 3
	Nonpregnant[c]	3	76 ± 7	6 ± 3	53 ± 17	29 ± 9

[a] Samples from Porter Lake.

[b] Samples from Sifton Lake.

[c] Samples from Porter and Sifton Lakes.

Table 6. Whole body weights (kg) of caribou sampled from the Beverly herd from March 1982 to March 1984 (sample sizes are in parentheses).

Sex	Age (yr)	Mar. '82	Nov. '82	Mar. '83	Dec. '83	Mar. '84	
						Sifton	Porter
Female	½-1	43 (13)		41 (5)			42 (4)
Male	½-1	50 (3)	42 (5)	44 (2)	44 (7)		45 (4)
Female	1½-2	60 (13)	61 (8)	58 (15)	55 (7)	59 (3)	63 (9)
Male	1½-2	67 (12)	66 (7)	64 (22)	67 (6)	62 (4)	65 (5)
Female	2½-3	76 (4)	70 (3)	74 (10)	72 (6)	75 (4)	80 (11)
Male	3½-3	86 (19)	85 (4)	82 (20)	85 (12)	76 (9)	86 (10)
Female	3½-4	77 (8)	80 (2)	74 (23)	82 (6)	78 (6)	87 (25)
Male	3½-4	87 (7)	94 (9)	93 (7)	100 (7)	89 (2)	105 (5)
Female	4½-5	86 (8)	80 (8)	80 (17)	75 (5)	73 (3)	84 (9)
Male	4½-5	98 (2)	85 (3)	104 (4)	98 (3)		112 (1)
Female	5½-11	84 (29)	82 (18)	82 (29)	83 (15)	83 (3)	88 (27)
Male	5½-11		116 (1)			100 (1)	127 (2)
Female	>11	87 (10)	80 (3)	83 (2)	97 (1)		91 (3)

Table 7. Depths (mm) of back fat in six samples of caribou from the Beverly herd, March 1982 to March 1984 (sample sizes in parentheses).

Sex	Age (yr)	Mar. 1982	Nov. 1982	Mar. 1983	Dec. 1983	Mar. 1984	
						Sifton L.	Porter L.
Female	½-1	1.2 (13)		0.3 (4)			1.0 (4)
Male	½-1	0.4 (7)	0.5 (4)	1.0 (2)	0.9 (7)		1.5 (4)
Female	1½-1	2.8 (12)	5.0 (8)	1.9 (15)	6.7 (7)	2.3 (3)	8.0 (9)
Male	1½-1	1.3 (11)	0.3 (6)	1.2 (22)	1.2 (6)	0.8 (4)	1.2 (5)
Female	2½-3	15.0 (3)	1.7 (3)	11.5 (10)	9.0 (6)	11.5 (4)	19.7 (11)
Male	2½-3	1.3 (18)	0.5 (4)	0.6 (18)	0.6 (12)	1.1 (9)	2.3 (10)
Female	3½-4	12.3 (4)	21.0 (1)	8.7 (23)	19.0 (6)	9.5 (6)	21.5 (25)
Male	3½-4	0.6 (7)	0.2 (10)	0.3 (8)	2.4 (7)	0.5 (2)	11.8 (5)
Female	4½-5	26.4 (7)	9.0 (9)	12.9 (18)	10.6 (5)		
Male	4½-5	0 (1)	8.0 (3)	1.5 (4)	1.0 (3)		12 (1)
Female	5½-11	14.5 (28)	9.4 (19)	7.5 (29)	12.8 (15)	15.7 (3)	20.9 (27)
Male	5½-11					0 (1)	24.0 (2)
Female	>10½	18.4 (10)	0.5 (2)	8.5 (2)	20 (1)		21.3 (3)

Table 8. Weight of fat around the kidneys of caribou sampled at five collection periods from March 1982 to March 1984 (sample sizes in parentheses).

Sex	Age (yr)	Mar. 1982	Nov. 1982	Mar. 1983	Dec. 1983	Mar. 1984	
						Sifton L.	Porter L.
Female	½-1	29 (9)		20 (5)			25 (4)
Male	½-1	32 (8)	26 (4)	26 (2)	31 (7)		26 (4)
Female	1½-1	45 (9)	56 (7)	47 (15)	52 (7)	57 (3)	73 (9)
Male	1½-1	57 (9)	32 (6)	40 (22)	53 (6)	41 (4)	41 (5)
Female	2½-3	83 (3)	77 (3)	83 (10)	81 (6)	84 (4)	109 (11)
Male	2½-3	61 (19)	32 (4)	51 (20)	56 (12)	70 (9)	78 (10)
Female	3½-4	89 (7)	89 (2)	81 (23)	114 (6)	113 (6)	128 (25)
Male	3½-4	41 (6)	36 (9)	60 (8)	56 (7)	56 (2)	131 (5)
Female	4½-5	120 (7)	69 (9)	98 (16)	68 (5)	78 (3)	136 (9)
Male	4½-5	50 (2)	61 (3)	63 (4)	50 (3)		131 (1)
Female	5½-11	97 (40)	68 (19)	89 (28)	83 (15)	94 (3)	122 (27)
Male	5½-11					81 (1)	126 (2)
Female	>10½	104 (12)	69 (3)	36 (2)	116 (1)		132 (3)

Table 9. Kidney fat indices of caribou from the Beverly herd sampled at five periods from March 1982 to March 1984 (sample sizes in parentheses).

Sex	Age (yr)	Mar. 1982	Nov. 1982	Mar. 1983	Dec. 1983	Mar. 1984	
						Sifton L.	Porter L.
Female	½-1	33 (9)		23 (5)			26 (4)
Male	½-1	28 (7)	24 (4)	26 (2)	30 (7)		23 (4)
Female	1½-2	37 (9)	45 (7)	38 (15)	41 (7)	42 (3)	52 (9)
Male	1½-2	39 (9)	21 (6)	27 (22)	35 (6)	29 (4)	29 (5)
Female	2½-3	73 (3)	49 (3)	58 (10)	54 (6)	53 (4)	75 (11)
Male	2½-3	35 (17)	20 (4)	28 (20)	32 (12)	40 (9)	43 (10)
Female	3½-4	60 (7)	54 (2)	56 (23)	69 (6)	71 (6)	77 (5)
Male	3½-4	42 (5)	17 (9)	33 (8)	27 (7)	22 (2)	57 (5)
Female	4½-5	77 (7)	45 (10)	61 (16)	41 (5)	44 (3)	81 (9)
Male	4½-5	21 (1)	13 (1)	30 (4)	26 (3)		57 (1)
Female	5½-11	59 (28)	40 (19)	54 (28)	47 (15)	51 (3)	71 (27)
Male	5½-11					30 (1)	47 (2)
Female	>10½	56 (9)	21 (1)	21 (2)	59 (1)		68 (3)

Table 10. Pregnancy rates (percent) of four age-classes of caribou in the Beverly herd, March 1982 to March 1984. (Sample sizes in parentheses).

Age-Class (yr)	Mar. 1982	Mar. 1983	March 1984	
			N. Segment[a]	S. Segment
2	8 (13)	0 (15)	0 (10)	33 (9)
3	75 (4)	60 (10)	80 (10)	100 (11)
4	75 (8)	57 (23)	100 (12)	96 (25)
>4	94 (47)	83 (46)	74 (27)	97 (39)

[a]Includes samples obtained in December 1983.

Table 11. Two condition indices and pregnancy rates of females older than three years obtained from the Beverly herd in March each year, 1980 to 1984 (sample sizes in parentheses).

Year	Weight (kg)	Kidney fat index	Pregnancy rate (%)
1980	80.7 (13)	47 (13)	92 (13)
1981	84.4 (5)	75 (13)	100 (5)
1982	83.7 (55)	61 (51)	91 (55)
1983	79.1 (71)	55 (69)	74 (69)
1984	N[a] 77.8 (12)	59 (12)	82 (39)[b]
	S[a] 87.5 (64)	75 (64)	97 (64)

[a] N = northern segment; S = southern segment.

[b] Sample includes caribou collected near Tent Lake in December 1983.

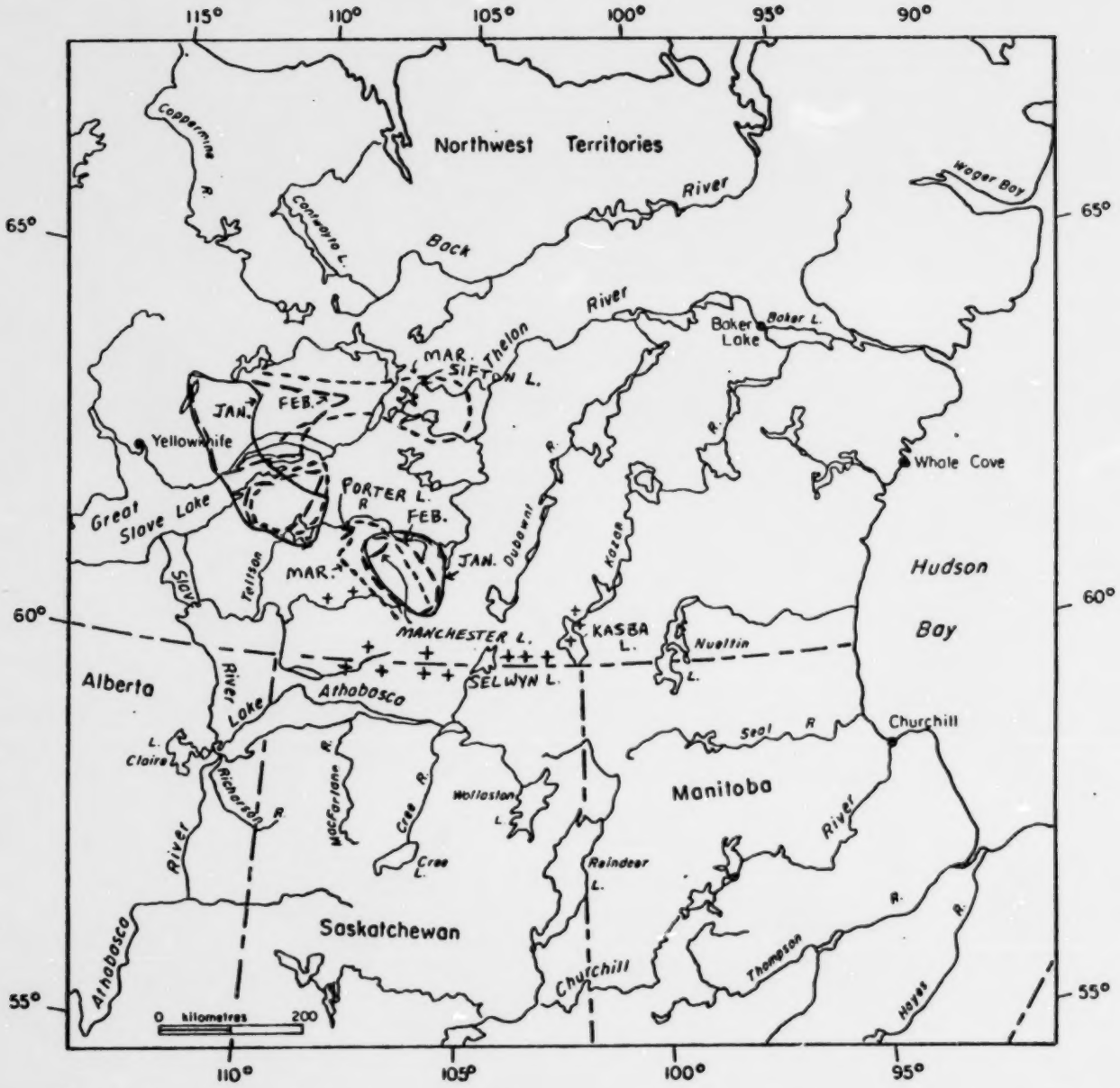

Figure 1. Location of segments of the Beverly herd of caribou in January, February, and March, 1984. The + symbol represents distributions of low density.

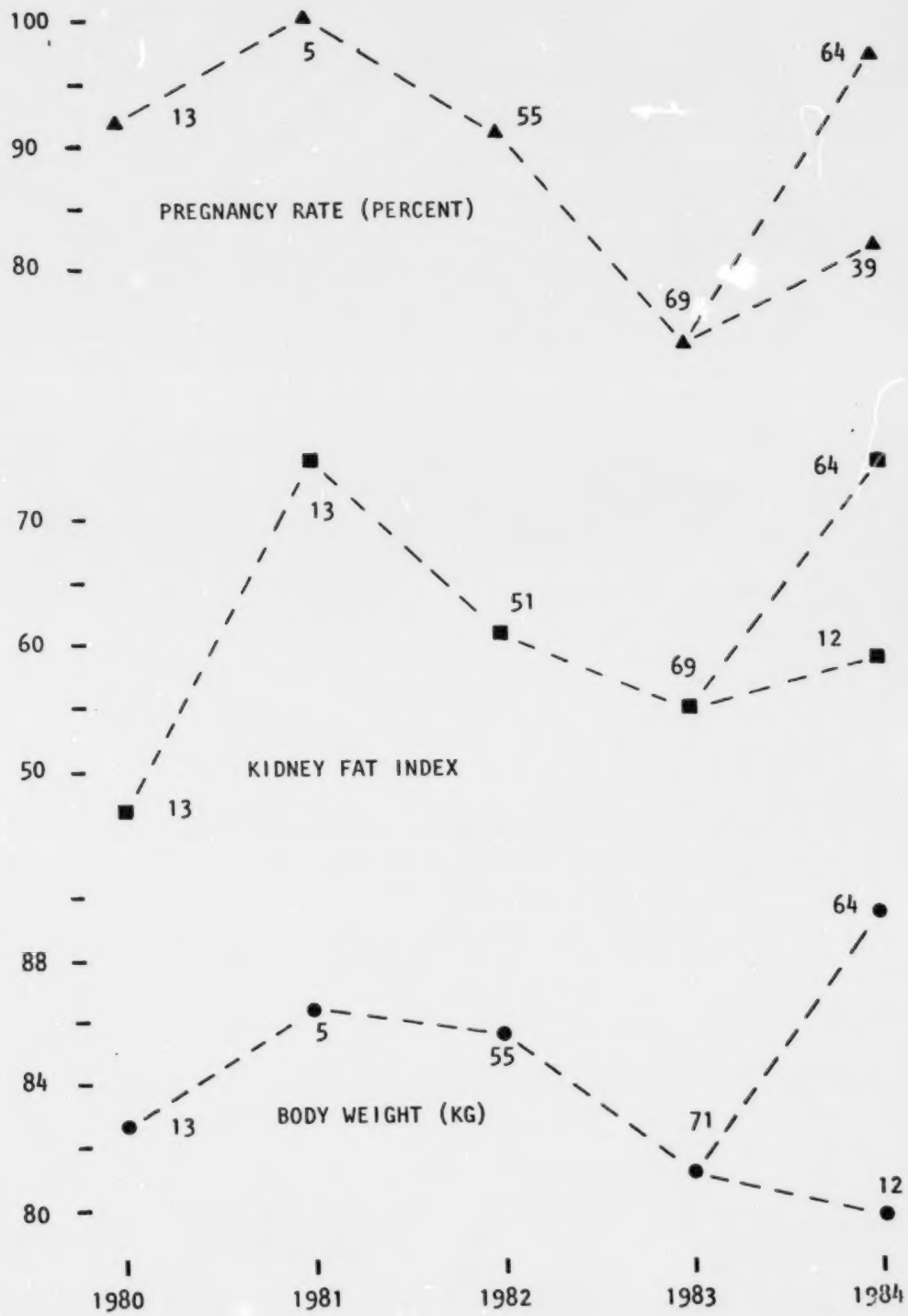

Figure 2. Changes in weight, the kidney fat index, and pregnancy rates of female caribou over 3 years old in the Beverly herd each March from 1980 to 1984. Sample sizes are beside each point.

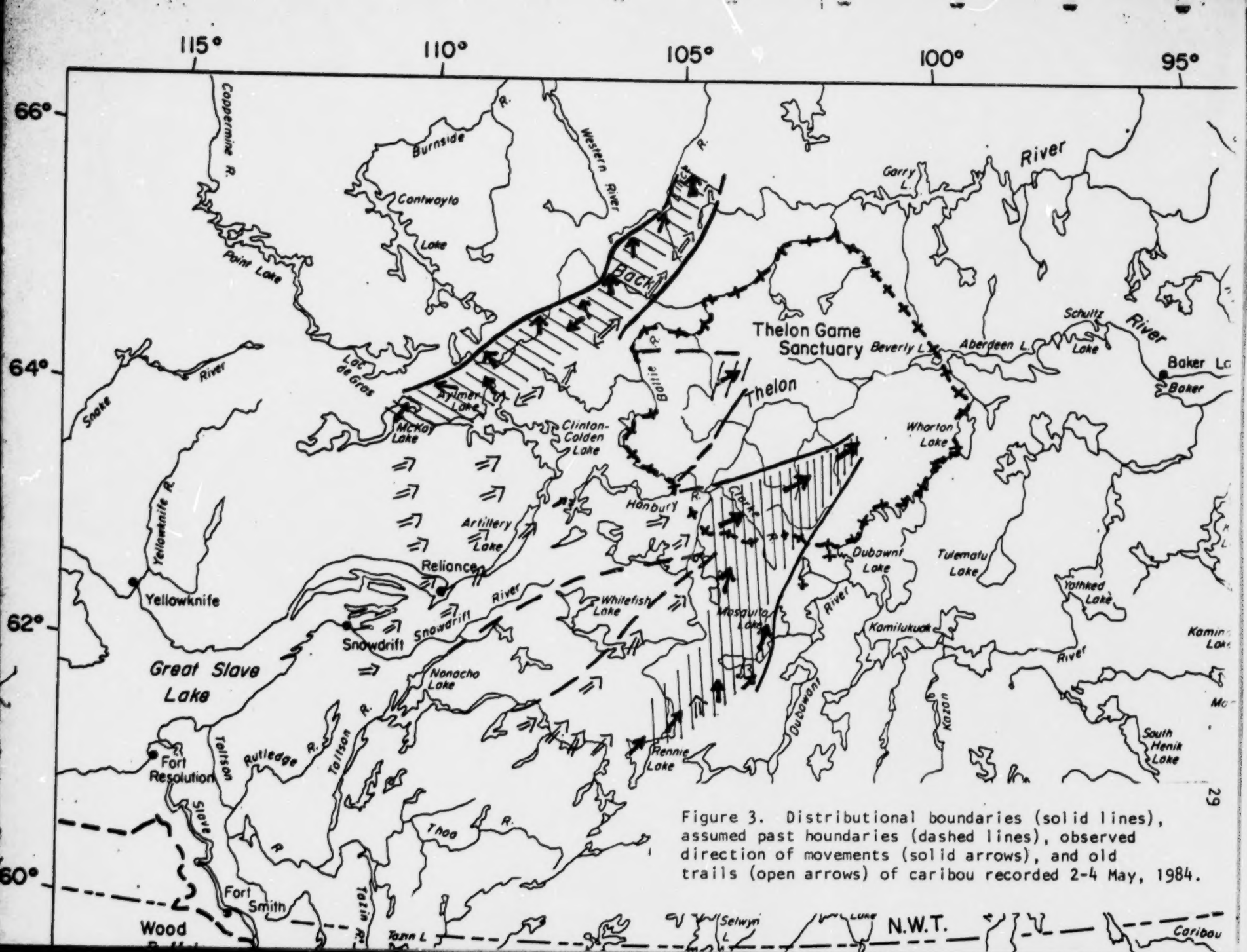

Figure 3. Distributional boundaries (solid lines), assumed past boundaries (dashed lines), observed direction of movements (solid arrows), and old trails (open arrows) of caribou recorded 2-4 May, 1984.